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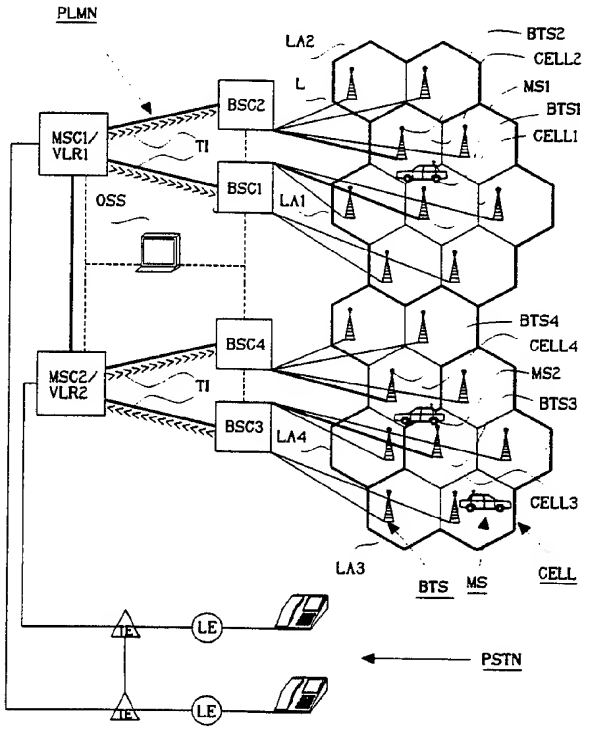
(54) Title: A METHOD FOR REGISTERING TRAFFIC DATA IN A TELECOMMUNICATION SYSTEM

(57) Abstract

A method for registering traffic data from mobile stations (MS1, MS2) in a mobile telecommunication system (PLMN). The mobile telecommunication system includes mobile switching centres (MSC1, MSC2) and connected with these, base station controllers (BSC1-BSC4), so-called primary and secondary base station controllers. Base stations (BTS) are connected to the base station controllers, each base station (BTS) covering a cell (CELL) and each base station controller (BSC1-BSC4) thereby covering a cell area containing several cells. Traffic data from a selected mobile (MS2) is stored in the primary base station controller of the mobile. A known problem is that registration of traffic data ceases at the same time the mobile leaves the cell area controlled by the primary base station controller. According to the present invention, a message "trace invocation" is sent from the primary base station controller to the secondary base station controller, via the mobile switching centre (MSC2), when the mobile moves to a cell handled by the secondary base station controller (BSC4). Registration of traffic data is thereafter effected in the secondary base station controller (BSC4).



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A METHOD FOR REGISTERING TRAFFIC DATA IN A TELECOMMUNICATION SYSTEM

TECHNICAL FIELD

The present invention relates to a method for registering in a mobile telecommunication system, traffic data deriving from mobile stations. The system includes at least one mobile services switching centre, a visitor location register belonging to the switching centre, at least two base station controllers connected to the switching centre. At least one base station is connected to each controller, wherein the radio covering area of respective base stations is called a cell. A group of cells belonging to a switching centre is called a service area, and a mobile station which enters said service area is registered in a visitor location register.

BACKGROUND ART

When cellplanning a mobile telecommunication system, it is important to be able to register information about the traffic behaviour, i.e. it is important to be able to register traffic and measurement data that derives from one or more mobile stations. When constructing a cell network, it is also important to be able to detect the presence of one or more mobiles in the vicinity of a border between two cells, in order to verify the earlier estimated radio coverage. It is also important to be able to study the intensity of the traffic in the cell when modifying the cell network, for instance when wishing to divide a cell into two parts. Finally, it is often desirable to be able to study the behaviour of a given type of mobile, so as to enable a comparison to be made with other types of mobile stations, for instance.

WO 88/08238 discloses a method of registering mobile stations in a mobile telecommunication system and therewith determine the geographical location of the mobile. A method of registering traffic data from one or more mobile stations located within a

group of cells controlled by a base station controller while a call is in progress is also known from GSM-recommendation 08.08. A message "trace invocation" is ordered by an order command in a switching central to be sent to the base station controller as soon as a call has been connected to the selected mobile station. Registration of traffic data from the mobile is commenced upon receipt of the "trace invocation" message by the base station controller, and traffic data is stored in a database in the base station controller. The traffic data to be stored in the database has earlier been determined in response to a storage command in the base station controller and may have the following nature: The frequency used by the mobile or when the mobile from one cell to another within the cell area controlled by the base station controller, i.e. when so-called inter-BSC-handover takes place. One problem with this known technique is that registration of traffic data ceases at the same time as the mobile leaves the cell area of the base station controller, i.e. after a so-called inter-BSC-handover. Another problem with this known technique is that when a storage command is preinserted in the base station controller, prior to having received the "trace invocation" command, it is necessary to determine the type of traffic data to be registered. This predetermined type of traffic data will then apply to traffic data from all selected mobile stations.

DISCLOSURE OF THE INVENTION

The aforesaid problems are solved in accordance with the invention by dispatching a message "trace invocation" from a primary base station controller to a secondary base station controller via a switching centre, when a mobile station from which data registration is requested passes a boundary between two cells which are controlled by different base station controllers, i.e. when an inter-BSC-handover takes place from the primary base station controller to a secondary base station controller. Registration of traffic data then continues in the secondary base station controller. According to the present invention, the message "trace invocation" contains an argument which discloses which traffic data deriving from the mobile shall be registered.

The method is characterized by the features set forth in the following method Claims.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 illustrates schematically and from above a typical telecommunication network and a typical mobile telephone system.
Figure 2 is a flow diagram of an inventive method and illustrates an MSC-ordered trace invocation.
Figure 3 illustrates the construction of a message "trace invocation".
Figure 4 is a flow diagram of an inventive method in conjunction with a BSC-ordered trace invocation.

BEST MODES OF CARRYING OUT THE INVENTION

Figure 1 illustrates a GSM-type mobile telephone network PLMN which is connected to a general telephone network PSTN. Local subscribers in the general telephone network are connected to local exchanges LE, which distribute calls to and from the local subscribers. Calls are connected further to mobile switching centres MSC in the mobile telephone network, through the agency of transit exchanges TE. The mobile telephone network PLMN used in the exemplifying embodiments includes a first and a second mobile switching centre MSC1, MSC2, whose main purpose is to distribute calls to base station controllers BSC and to handle handovers when a mobile station MS crosses a boundary between two cells controlled by different base station controllers, these handovers being described in more detail herebelow. The first switching centre MSC1 is connected by cables to a first and a second base station controller BSC1, BSC2, and the second switching centre is similarly connected to a third and a fourth base station controller BSC3, BSC4. The main purpose of the base station controllers is to monitor and administer base stations BTS and to distribute calls from the switching centres MSC to the mobile stations MS. Each of the base station controllers BSC is connected to a plurality of base stations BTS, wherein in the case of the Figure 1 embodiment, the first and the third base station

controllers BSC1, BSC3 are each connected to five base stations by cables L. The second and the fourth base station controllers BSC2, BSC4 are similarly connected to each of four base stations. The base stations include the radio equipment necessary to establish radio communication with the mobile stations MS. Each base station transmits radio signals, where the radio covering area of each base station is designated cell, CELL. The base stations BTS are dispersed geographically in order to meet traffic needs on coverage and capacity. The total radio covering cell area associated with a particular switching centre MSC is referred to as the service area. This service area is, in turn, divided into localizing areas, which are bordered by heavy cell-encompassing lines in the Figure 1 illustration. A first location area LA1 includes five cells which are handled by the first base station controller BSC1, and two cells which are handled by the second base station controller BSC2. A second location area LA2 includes two cells which are handled by the second base station controller. A third location area LA3 includes four cells which are handled by the third base station controller BSC3, and one cell which is handled by the fourth base station controller BSC4. A fourth localizing area LA4 includes a cell which is handled by the third base station controller, and three cells which are handled by the fourth base station controller. Figure 1 also shows that the first switching centre MSC1 includes a first visitor location register VLR1, and that the second switching centre MSC2 includes a second visitor location register VLR2. All those mobile stations which at that time are handled by the switching centre connected to the register are registered in the visitor location registers VLR, i.e. all mobiles which are located within the service area of the switching centres. Figure 1 also illustrates an operator unit OSS, which is connected to all mobile switching centres MSC1, MSC2 and base station controllers BSC1, BSC2, BSC3, BSC4, so as to enable these centres and controllers to be controlled and monitored with the aid of control commands issued from a central station, such as a control room, for instance.

The above-described mobile telecommunication system operates in accordance with the GSM-recommendations, although the invention,

which will now be described, can also be used in similar types of systems. As before mentioned, it is important that traffic data can be registered from one or more mobile stations in cell scheduling processes, for instance. The inventive method illustrated in Figure 2 is referred to as an MSC-ordered trace invocation and is described in the following:

- Using a select command 1, an operator selects from the visitor location register VLR1, a mobile station MS1 from which traffic data registration is desired. The mobile station is registered in the visitor location register immediately the mobile enters one of the location areas LA1, LA2 of the switching centre.

- Using an order command 2 from a terminal which is connected to the switching centre MSC1, the operator orders the switching centre to send a message "trace invocation" TI to that base station controller in which the mobile station is located, immediately and every time a call connection has been established with the selected mobile MS1. The order command includes parameters which disclose the mobile station MS1 from which registering shall take place, the type of traffic data to be registered, and information as to when registration of the traffic data shall begin. The message "trace invocation" TI will be described in more detail later on.

- The mobile switching centre MSC1 sends a paging message 3a to all base stations BTS which belong to the location area LA1 in which the mobile is located according to the visitor location register VLR1, so as to connect the call from the general network PSTN to the selected mobile station MS1. The base stations send the paging message to those mobile stations that are located within the cell area of respective base stations. The selected mobile MS1 confirms the message, by sending a paging response message 3b to the base station BTS1 in whose cell, CELL1, the mobile is located. The paging response message 3b is then sent from the base station BTS1 to the switching centre MSC1, via the base station controller BSC1. The switching centre therewith obtains information as to the base station controller BSC1 which

handles the cell in which the selected mobile station MS1 is located. The call is now connected with the mobile MS1, via the primary base station controller BSC1 in accordance with block 3c.

- The earlier commanded and stored message "trace invocation" TI is transmitted in accordance with block 4, through the agency of a start condition which is triggered when calls are connected to the mobile MS1. The message is sent from the switching centre MSC1 to the base station controller BSC1, called the primary base station controller, which controls the cell, CELL1, called primary cell, in which the mobile station MS1 is located.

- Registration 5 of traffic data from the mobile MS1 is effected in the primary base station controller in accordance with the desiderata pre-specified in the message "trace invocation" TI, provided that the call is connected and that the mobile is located within a cell area that is controlled by the primary base station controller BSC1. Traffic data is herewith stored in a database in the primary base station controller.

- The mobile station MS1 approaches another cell, CELL2, called the secondary cell, which is controlled by another base station controller, BSC2, hereinafter called the secondary base station controller. The primary base station controller BSC1 requests a handover from the primary cell, CELL1, to the secondary cell, CELL2, by sending a message "handover request" 6a to the switching centre MSC1. After receiving the "handover request", the switching centre sends a message "handover query" 6b to the secondary base station controller BSC2, which after a successful takeover of the mobile from the primary base station controller BSC1 sends a "handover confirmation" message 6c to the mobile switching centre MSC1. The mobile MS1 now converses via the secondary base station controller BSC2, in accordance with block 6d.

- After the successful handover of the mobile station MS1 from the primary base station controller BSC1 to the secondary base station controller BSC2, the mobile switching centre sends the earlier stored "trace invocation" message TI to the secondary base station

controller BSC2 on the basis of the handover confirmation 6c, in accordance with block 7.

- Registration 8 of traffic data from the mobile station MS1 is effected in the secondary base station controller BSC2 in accordance with the desiderata earlier specified in the "trace invocation" message TI, provided that the call is connected and that the mobile is located within a cell area that is controlled by the secondary base station controller BSC2. Traffic data is herewith stored in a database in the secondary base station controller. The inventive switching of the "trace invocation" message TI between two base station controllers can according to the preferred embodiment be repeated, provided that a call is connected and that the mobile is located within the service area of the mobile switching centre.

The aforesaid "trace invocation" message TI will now be described in greater detail. Selected parts of the parameters in the order command 2 "Order Trace Invocation" are rearranged in accordance with the invention and placed in the message "trace invocation" in accordance with Figure 3. The message has three octets, where octet 1 contains a number which is specific to the message "trace invocation" TI. Octet 2 discloses from where "trace invocation" has been ordered, i.e. in this case from the switching centre MSC1. Octet 2 also specifies those occasions on which registration is desired, which in the case of the illustrated embodiment shall take place on those occasions on which the mobile station crosses cell boundaries. Octet 3 contains a registration reference which identifies the mobile station, i.e. in this case the selected mobile station MS1. The uppermost row of bit numbers in Figure 3 is not included in the message "trace invocation" TI, but merely shows the eight positions in the octets. Reference A in octet 1 denotes the trace invocation message number, reference B denotes whether trace invocation has been ordered by a mobile switching centre or by a base station controller, reference C denotes what is to be registered, and reference D denotes a registration reference which is a replacement for the telephone number of the mobile station. Other positions in the message are marked with

zeros (0). It is to be noted that the structure of the message "trace invocation" described above is just an example of such structure and the message is not limited to the message with the same notation described in the GSM-recommendations quoted earlier.

Another exemplifying embodiment of the invention will now be described. As before mentioned, it is important to be able to register traffic data from one or more mobile stations when scheduling cells, for instance. The inventive method illustrated in Figure 4 is referred to as a BSC-ordered trace invocation. An operator situated at a base station controller BSC3 does not have access to the visitor location register VLR2 and cannot therefore select a specific mobile station located within a cell area controlled by the base station controller. Consequently, with BSC-ordered trace invocation, there is used a more collective registration criterion where it is irrelevant which mobile station precisely fulfils the criterion. The inventive method is described below:

- An operator chooses to register all mobile stations that cross a boundary between two cells, CELL3 and CELL4, that are handled by different base station controllers BSC3, BSC4. The operator wishes to know the signal strength both before and after the cell change. The mobile stations are generally referenced MS.

- Using an order command 12 from a terminal connected to the base station controller BSC3, the operator orders the base station controller BSC3 to register traffic data from mobiles that have established call connections, as soon as these mobiles have entered the cell area which is handled by the base station controller. The order command 12 contains parameters which disclose the type of traffic data to be registered and also information as to when the registration shall begin. According to the invention, selective parts of the parameters in the command are rearranged and placed in the message "trace invocation" TI. The "trace invocation" message TI has the same structure as the message in the earlier described embodiment, although the content

of the message differs slightly. The "trace invocation" message will be described in more detail later on.

- The mobile station MS2 to which a call has been connected enters 13a in the cell area of the base station controller BSC3. The base station controller BSC3 is hereinafter called the primary base station controller and the mobile MS2 now receives its call via the primary base station controller, in accordance with block 13b.

- Registration 14 of traffic data from the mobile MS2 is effected in the primary base station controller in accordance with the desiderata earlier specified in the order command 12 and the message "trace invocation" TI, provided that the call is connected and that the mobile is located within the cell area that is controlled by the primary base station controller BSC3. Traffic data is herewith stored in a database in the primary base station controller.

- The mobile station MS2 located in the cell, CELL3, called the primary cell, approaches another cell, CELL4, called the secondary cell, which is controlled by another base station controller BSC4, called the secondary base station controller. The primary base station controller sends the message "trace invocation" 15 to the switching centre MSC2. At the same time, the primary base station controller requests handover from the primary cell, CELL3, to the secondary cell, CELL4, by sending a "handover request" message 16a to the switching centre MSC2. Upon receipt of the "handover request", the switching centre sends a "handover query" message 16b to the secondary base station controller BSC4, which after successful takeover of the mobile from the primary base station controller BSC3 sends a message "handover confirmation" 16c to the mobile switching centre MSC2.

The mobile MS2 now converses via the secondary base station controller BSC4, in accordance with block 16d.

- Subsequent to successful takeover of the mobile station MS2 from the primary base station controller BSC3 to the secondary

base station controller BSC4, the mobile switching centre sends the message "trace invocation" TI to the secondary base station controller BSC4 in response to the handover confirmation 16c, in accordance with block 17. The message "trace invocation" TI is not stored in the mobile switching centre MSC2.

- The registration 18 of traffic data from the mobile station MS2 is effected in the secondary base station controller BSC4 in accordance with the desiderata earlier specified in the message "trace invocation" TI, provided that the call has been connected and the mobile is located within a cell area that is controlled by the secondary base station controller. Traffic data is herewith stored in a database in the secondary base station controller. The inventive switching of the message "trace invocation" TI between two base station controllers can according to the preferred embodiment be repeated for as long as a call is connected and for as long as the mobile is located within the service area of the mobile switching centre.

The above-mentioned message "trace invocation" TI will now be described in greater detail. According to the invention, selected parts of the parameters in the order command 12 "Order Trace Invocation" are rearranged and placed in the message "trace invocation", in accordance with Figure 3. The message "trace invocation" TI has the same structure as the message described with reference to the preceding embodiment, although the content of the message differs slightly. Octet 2 discloses information as to from where "trace invocation" was ordered, which in the present case is from base station controller BSC3. Octet 2 also specifies the occasions on which registration is desired, which in the present case is when the mobiles MS approach a given cell boundary. Octet 3 includes a registration reference which identifies the selected mobile stations, i.e. in the present case all mobile stations to which a call has been connected and which are located within the cell area controlled by the base station controller BSC3.

It will be understood that the aforedescribed exemplifying embodiments of the invention can be varied and modified without departing from the scope of the present invention. For instance, traffic data may consist of all information transmitted between a mobile station and a base station controller. The terminal cited in the exemplifying embodiments need not be a local data unit connected to a specific switching centre or base station controller, but may be a centrally located operator system OSS that is connected to all switching centres and base station controllers of the mobile telecommunication system. After the tracing process, traffic data can be collected from databases and read-out in the operator system. In the case of the exemplifying embodiments, the message "trace invocation" is created in response to an order command from the operator. Alternatively, the message can be generated by a program in the switching centre, the base station controller or the operator system which is activated at a given time point or by some other criterion. The message "trace invocation" TI created in accordance with Figure 3 is to be considered only as an example of such message. It should also be understood that the signalling described with reference to the exemplifying embodiments and illustrated in Figure 2 and Figure 4 is only representative of the signalling which is of interest to the present invention and does not represent the total amount of signalling that takes place on the aforedescribed occasions. One skilled in the art, realize of course that the trace method according to the invention is not limited to only one service area. The method can also be utilized when a mobile moves from one service area to another. It will also be understood that the invention is not restricted to the aforedescribed and illustrated exemplifying embodiments thereof and that modifications can be made within the scope of the following Claims.

CLAIMS

1. A method for registering traffic data from mobile stations in a mobile telecommunication system (PLMN) which includes at least one mobile switching centre (MSC1), a visitor location register (VLR1) connected to the switching centre, at least two base station controllers (BSC1, BSC2) connected to the switching centre, each of said base station controllers being connected to at least one base station (BTS), wherein the radio covering area of respective base stations is called a cell (CELL) and a group of cells belonging to a switching centre is called a service area, and wherein, subsequent to a mobile station (MS1) entering said service area, the mobile station is registered in the visitor location register (VLR1), said method comprising the steps of

- selecting at least one of the mobile stations (MS1) with the aid of a selection command (1);
- giving the switching centre (MSC1) an order command (2) to send a message "trace invocation" (TI) to the base station controller (BSC1, BSC2) which handles the cell group in which the selected mobile station (MS1) is located;
- fulfilling a start condition, for instance a condition that a call is connected (3a, 3b, 3c) to the selected mobile station (MS1);
- sending (4) the message "trace invocation" (TI) from the switching centre (MSC1) to a base station controller (BSC1), called the primary base station controller, which handles the cell (CELL1) in which the selected mobile station is located;
- storing (5) in a database in the primary base station controller traffic data incoming from the selected mobile station (MS1), wherein the selected mobile station crosses (6a, 6b, 6c, 6d) a boundary between two cells (CELL1, CELL2) handled by different base station controllers (BSC1, BSC2);

c h a r a c t e r i z e d by the further steps of

- sending (7) the message "trace invocation" (TI) from the switching centre (MSC1) to another base station controller (BSC2), called the secondary base station controller, which handles the cell (CELL2) in which the selected mobile station (MS1) is located subsequent to moving from one cell to another; and

- storing (8) in a database in the secondary base station controller traffic data incoming from the selected mobile station (MS1).

2. A method for registering traffic data from mobile stations in a mobile telecommunication system (PLMN) which includes at least one mobile switching centre (MSC2), at least two base station controllers (BSC3, BSC4) connected to the switching centre, each of said base station controllers being connected to at least one base station (BTS), where the radio covering area of respective base stations is called a cell (CELL), said method comprising the steps of

- ordering, by giving an order command (12) to the base station controller (BSC3), called the primary base station controller, in which the selected mobile station is located, said base station controller to create a message "trace invocation";
- a mobile station (MS2) fulfils a start conditions (13a);
- storing (14) traffic data incoming from the mobile station in a database in the primary base station controller, wherein the mobile station approaches a boundary between two cells (CELL3, CELL4) which are handled by different base station controllers (BSC3, BSC4);
- sending (15) the message "trace invocation" (TI) from the primary base station controller (BSC3) to the switching centre (MSC2), wherein the mobile station crosses (16a, 16b, 16c, 16d) the boundary between said two cells (CELL3, CELL4);

c h a r a c t e r i z e d by the further steps of

- sending (17) the message "trace invocation" (TI) from the switching centre (MSC2) to another base station controller (BSC4), called the secondary base station controller, which handles the cell (CELL4) in which the selected mobile station (MS2) is located after changing cells; and
- storing (18) traffic data from the selected mobile station (MS2) in a database in the secondary base station controller.

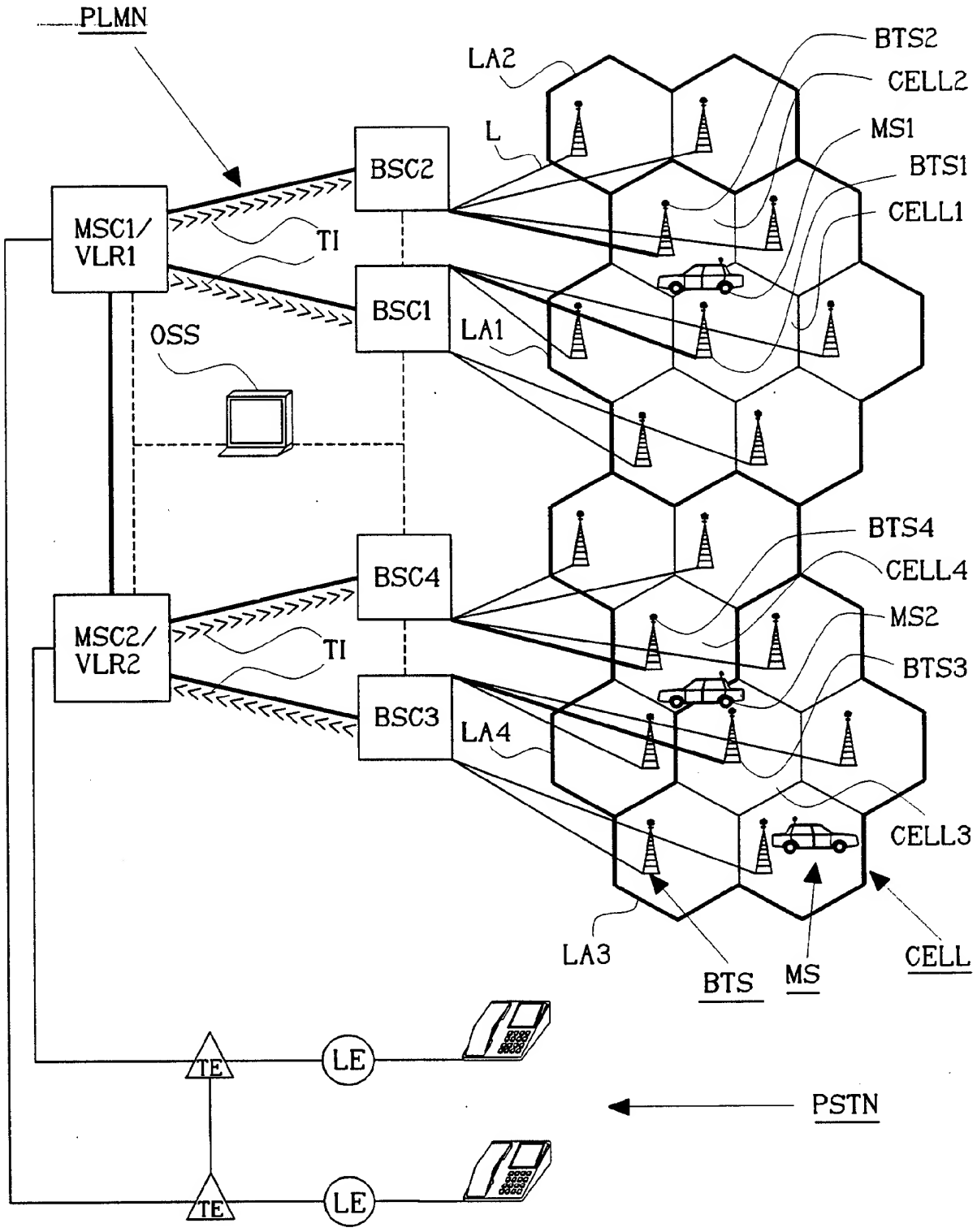
3. A method according to Claim 1 or 2, c h a r a c t e r i z e d by including in the message "trace invocation" (TI) a predetermined number of binary digits which discloses which

traffic data from the mobile station shall be stored in the data base.

4. A method according to Claim 3, c h a r a c t e r i z e d by sending the commands (1, 2, 12) from an external unit (OSS) connected to the switching centres (MSC1, MSC2) and the base station controllers (BSC1, BSC2, BSC3, BSC4).

5. A method according to Claim 4, c h a r a c t e r i z e d by entering the commands (1, 2, 12) when an established criterion has been fulfilled in a program in the switching centre (MSC1, MSC2), the base station controller (BSC1, BSC2, BSC3, BSC4) or in the external unit (OSS).

6. A method according to Claim 1, 2, 3, 4 or 5, c h a r a c t e - r i z e d in that traffic data stored in the database is collected and read-out by the external unit (OSS).


PLMN
BTS2
LA2
CELL2
L
MS1
BSC2
BTS1
MSC1/
VLR1
TI
CELL1
BSC1
OSS
LA1
BTS4
BSC4
CELL4
MSC2/
VLR2
TI
MS2
BTS3
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MS
CELL
TE
LE
PSTN
TE
LE

FIG 1

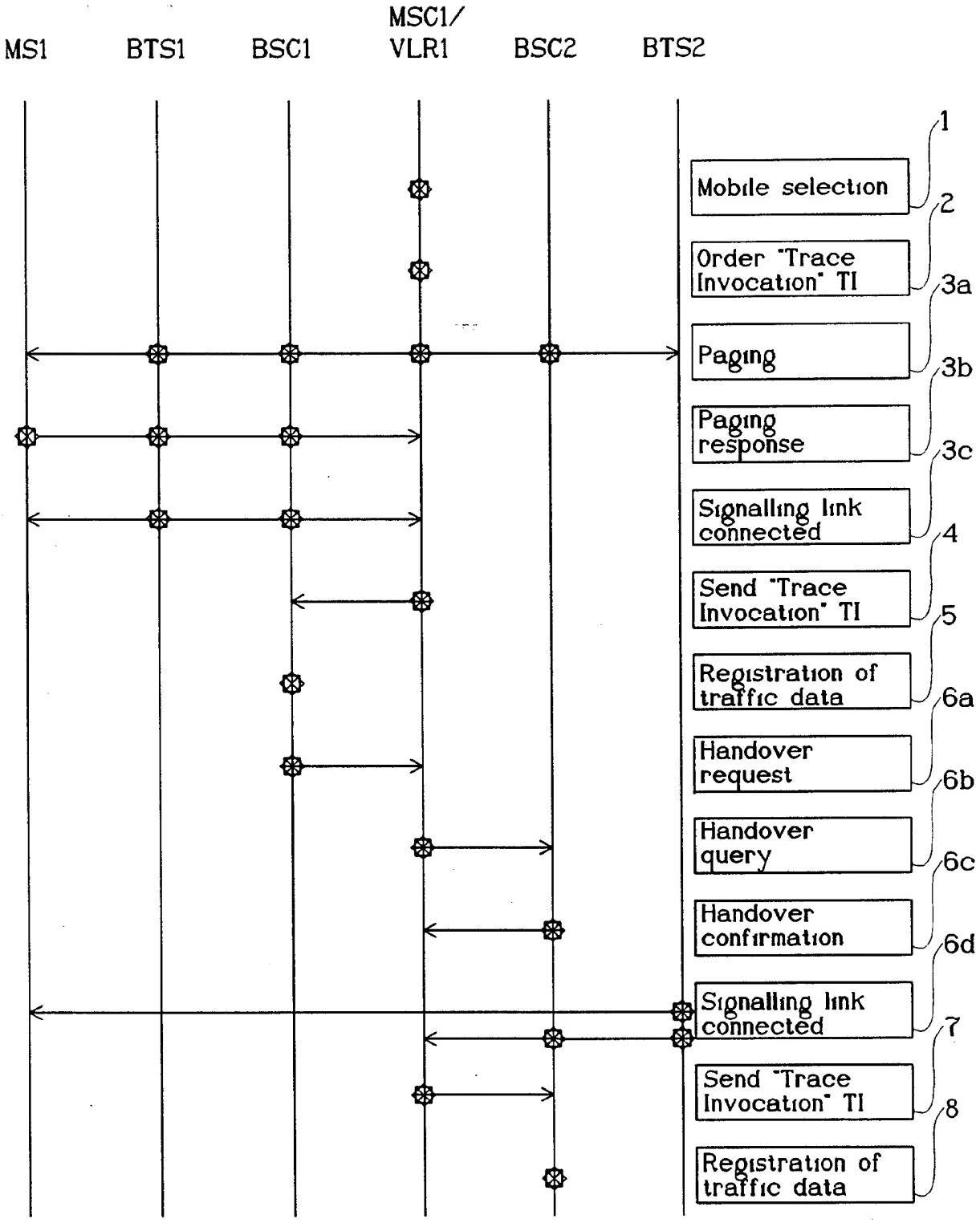
MS1
BTS1
BSC1
MSC1/
VLR1
BSC2
BTS2
1
Mobile selection
2
Order "Trace Invocation" TI
3a
Paging
3b
Paging response
3c
Signalling link connected
4
Send "Trace Invocation" TI
5
Registration of traffic data
6a
Handover request
6b
Handover query
6c
Handover confirmation
6d
Signalling link connected
7
Send "Trace Invocation" TI
8
Registration of traffic data

FIG2

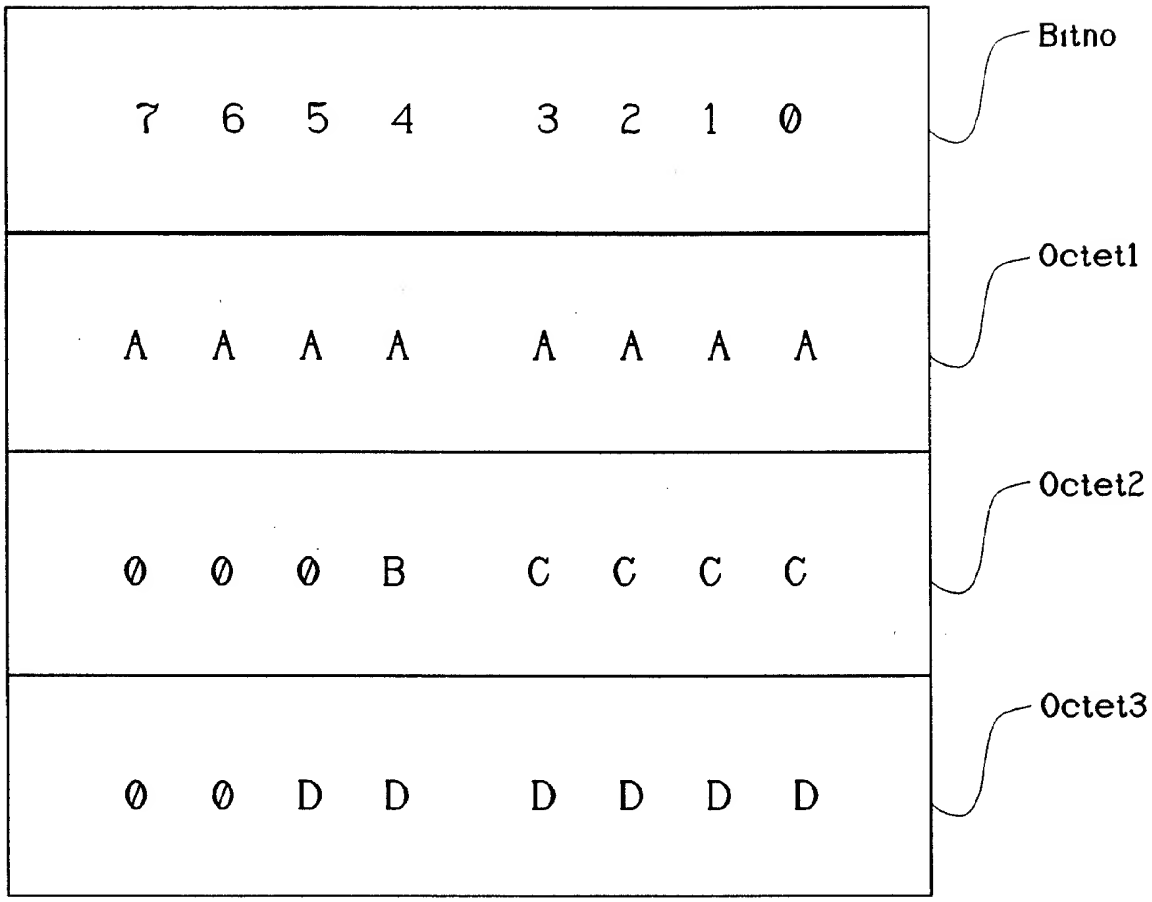
Bitno
7 6 5 4 3 2 1 0
Octet1
A A A A A A A A
Octet2
0 0 0 B C C C C
Octet3
0 0 D D D D D D

FIG 3

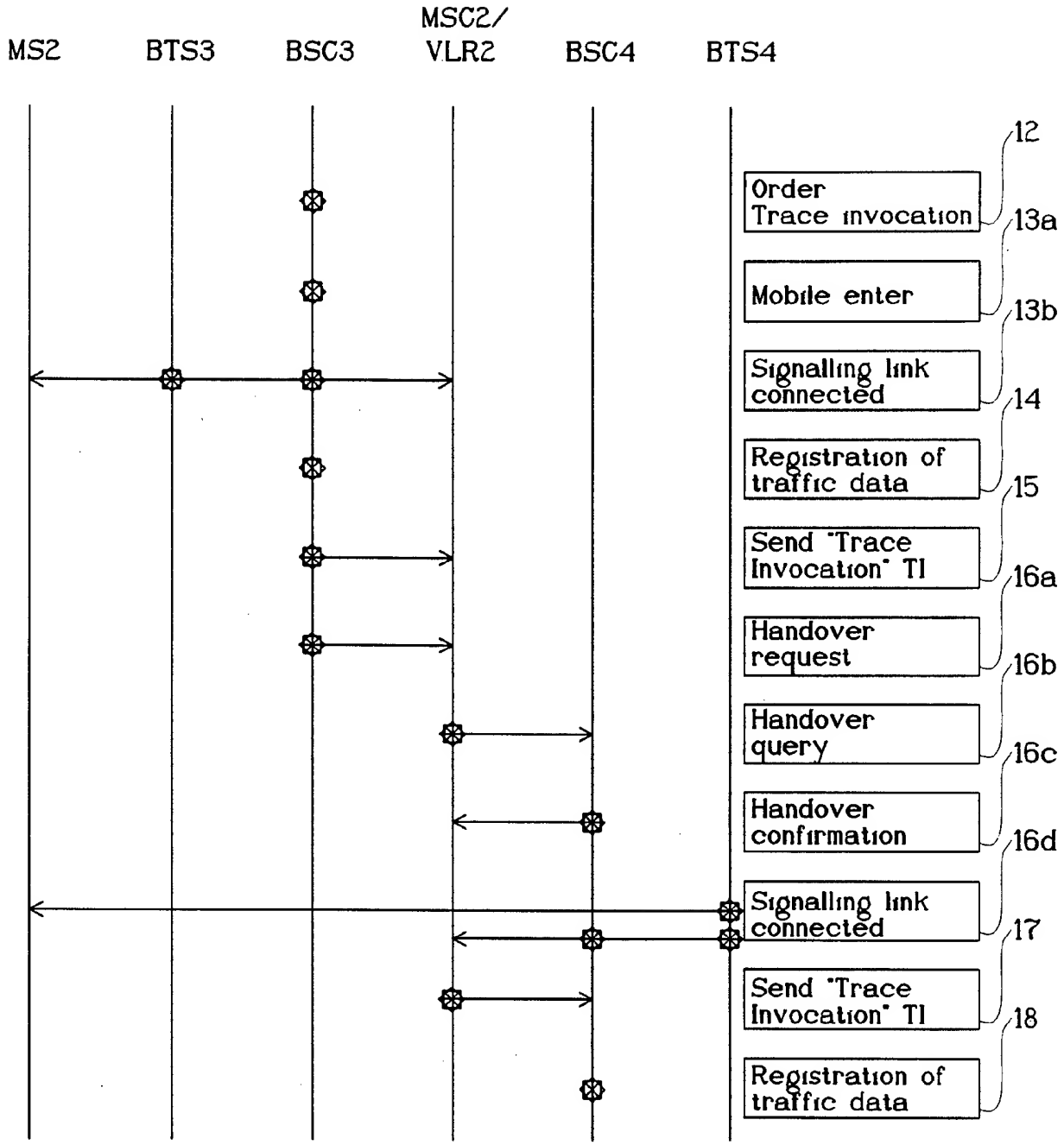
MS2
BTS3
BSC3
MSC2/
VLR2
BSC4
BTS4
12
Order
Trace invocation
13a
Mobile enter
13b
Signalling link
connected
14
Registration of
traffic data
15
Send "Trace
Invocation" TI
16a
Handover
request
16b
Handover
query
16c
Handover
confirmation
16d
Signalling link
connected
17
Send "Trace
Invocation" TI
18
Registration of
traffic data

FIG4

INTERNATIONAL SEARCH REPORT

International application No.
PCT/SE 93/00524

A. CLASSIFICATION OF SUBJECT MATTER

IPC5: H04Q 7/04
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC5: H04Q, H04B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO, A1, 8808238 (MOTOROLA INC), 20 October 1988 (20.10.88), see the whole dokument ---	1
A	EP, A1, 0465443 (TELEFONAKTIEBOLAGET L M ERICSSON), 8 January 1992 (08.01.92), column 5, line 13 - line 19; column 6, line 31 - line 51, figure 7 --- --------	2

☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"E" erlier document but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
1 October 1993	05 -10- 1993
Name and mailing address of the ISA/ Swedish Patent Office Box 5055, S-102 42 STOCKHOLM Facsimile No. +46 8 666 02 86	Authorized officer Göran Magnusson Telephone No. +46 8 782 25 00

Form PCT/ISA/210 (second sheet) (July 1992)

INTERNATIONAL SEARCH REPORT

Information on patent family members

26/08/93

International application No.
PCT/SE 93/00524

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO-A1- 8808238	20/10/88	EP-A- 0309572	05/04/89
EP-A1- 0465443	08/01/92	AU-B- 636504	29/04/93
		AU-A- 8180791	04/02/92
		CA-A- 2065876	07/01/92
		JP-T- 5501646	25/03/93
		SE-B,C- 466426	10/02/92
		SE-A- 9002377	07/01/92
		WO-A- 9201339	23/01/92